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Moose Population Estimates for Game Hunting Area 8: 1986.

Cross, Dale, Gene Collins, and Brian Knudsen. 1986

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ABSTRACT

Game Hunting Area 8, located east of The Pas, Manitoba, has an area of 3152 sq km In January 1986 an aerial survey was flown in a light fixed-wing aircraft to estimate the number of moose (Alces alces) in this area. Two non-independent observers were used to collect data according to a stratified strip transect design, with 4 strata. During the survey, 75 moose were seen in approximately 17% of the area of GHA 8. The point estimate for the population was 412. The 95% confidence interval was 292 to 531. Aerial surveys of GHA 8 since 1976 have shown a serious decline in moose numbers.

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INTRODUCTION

Game Hunting Area 8 (GHA 8) occupies an area of 3152 sq km (exclusive of large water bodies) east of The Pas, Manitoba (Fig. 1). The southern portion of the area is the Saskatchewan River Delta, and consists of a network of river channels, shallow lakes, heavily vegetated wetlands, and levees with deciduous tree cover. Some patches of high ground occur, with mixed coniferous and deciduous cover. The northern part of GHA 8 consists of large open bogs, shallow lakes, and occasional outcrops of limestone covered with mixed forest. Further descriptions of the area can be found in U.S. Bureau of Sport Fisheries and Wildlife (1961).

During the past 25 years, the status of this area has changed considerably because of the Grand Rapids hydroelectric project, increased road access (the Moose Lake and Cormorant Highways), and the proliferation of snowmobiles and other types of off-road vehicles. The most conspicuous change was the flooding of 1150 sq km of the Saskatchewan River Delta when the forebay of the Grand Rapids project was filled in 1963 and 1964. Changes in access were less obvious than the flooding, but equally important for the moose (Alces alces) population. Before the late 1960's, very few hunters used motorized transportation to hunt moose. Since that time, snowmobiles and outboard motors have become more readily available, and roads have been built to Moose Lake and Cormorant. As these changes in access occurred, the number of moose killed by hunters

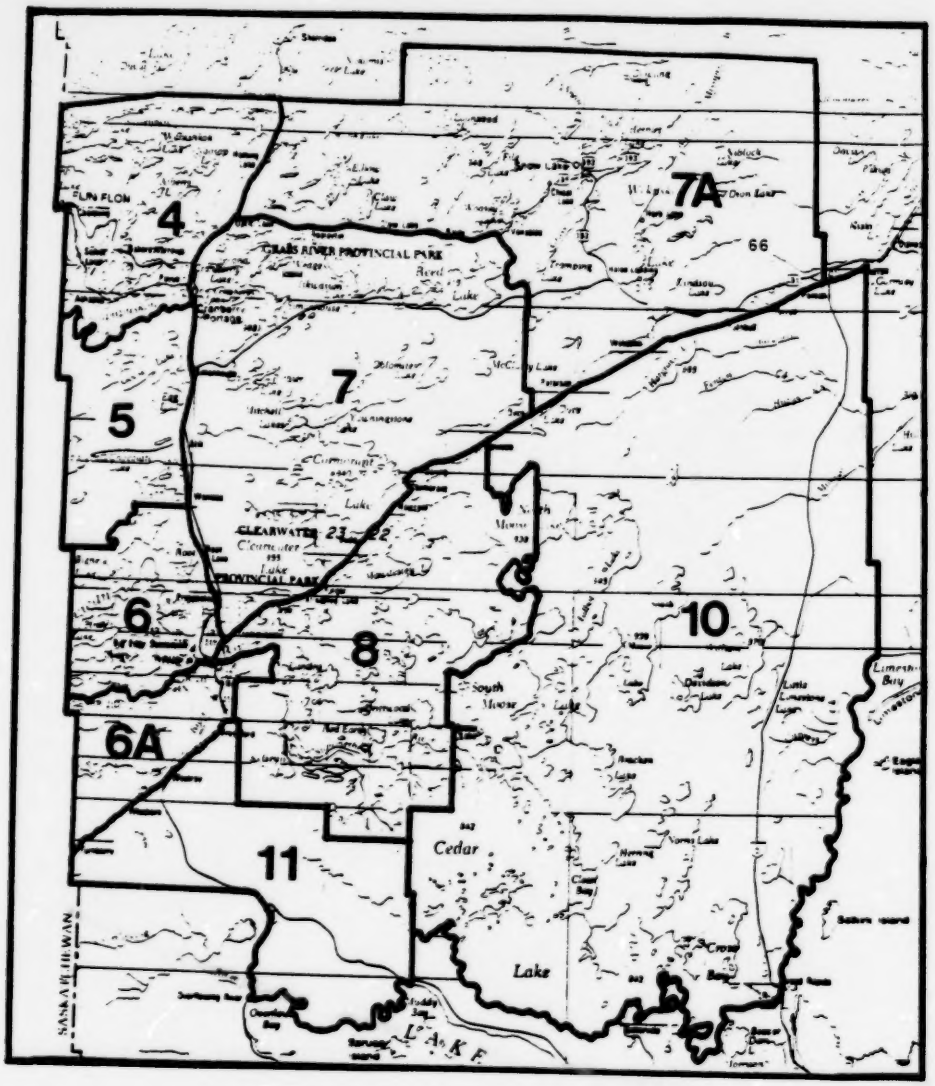

Figure 1. GHA 8 and surrounding area.

increased. The details of the increase in harvest are not known precisely (Knudsen 1984), but there is no doubt that the harvest increased and the number of moose decreased between the mid-1960's and the late 1970's. During this period 2 other changes occurred which had influences on the moose population. There was little attempt to control the wolf population in the area (poisoning had been used at times in the past) and there were no substantial fires to stimulate the growth of high-quality moose browse (the last major fire occurred in 1961).

The Wildlife Branch of the Department of Natural Resources became aware of the decline of the moose population through routine aerial surveys of the age and sex composition of the herd. Hunting seasons became restricted. To obtain more precise information on the status of the herd, surveys were flown to estimate the size of the population in 1976, 1977, and 1981 (Cross et al. 1983). These surveys verified that the herd was continuing to decline: from approximately 1000 in 1976 to approximately 650 in 1981. This decline represented a serious long-term problem, for subjective population estimates from the mid-1960's were in the vicinity of 1500 moose (R. Robertson pers. comm.)

In response to the moose herd's decline, which was persisting in spite of hunting restrictions, the Wildlife Branch entered into a cooperative moose management process in 1985. The Pas Game and Fish Association, Indian Bands from Moose Lake, The Pas, and Easterville, and the Community Councils of Cormorant and Moose Lake joined with the Province in creating and implementing a

comprehensive management plan for the resoration of the moose population in GHA 8. The most important aspect of this initiative was that an agreement was signed by all parties on 28 February, 1986, which prohibited all moose hunting in GHA 8 from 1 December, 1985 to 1 December, 1986. Concurrently, the Province set the objective of reducing the wolf population from approximately 40 to approximately 15, by selective trapping and hunting.

An important component of the management process is to monitor the response of the moose population to actions being taken. Accordingly, the Wildlife Branch conducted an aerial survey in January 1986 to estimate the number of moose in GHA 8. This report presents the results of that survey.

METHODS

As in previous years, two non-independent observers in a fixed-wing aircraft were used to conduct a strip transect survey in 4 strata (Fig. 2). Details of the method are in Cross et al. (1983). Sampling effort and the approximate abundance of moose (used to allocate sampling effort) in the 4 strata are in Table 1. Flights were conducted between 7 and 11 January, 1986. Weather during the survey conformed with standard Wildlife Branch criteria for conducting aerial surveys.

Data were analysed with the same program (Jacobson and Weatherill 1975) and the same computer (HP9830) used in previous years. The program follows Snedecor and Cochrane (1967).

Table 1. Characteristics and size of strata used in the stratified sampling design.

STRATUM NUMBER	SAMPLE BLOCK	QUADRAT SIZE (SQ KM)	TOTAL QUADRATS	SAMPLE QUADRATS	DENSITY / SQ KM
1	A	2.91	220	47	0.51
2	B	2.91	198	42	0.34
3	C	2.91	242	41	0.24
4	D	4.86	252	29	0.16

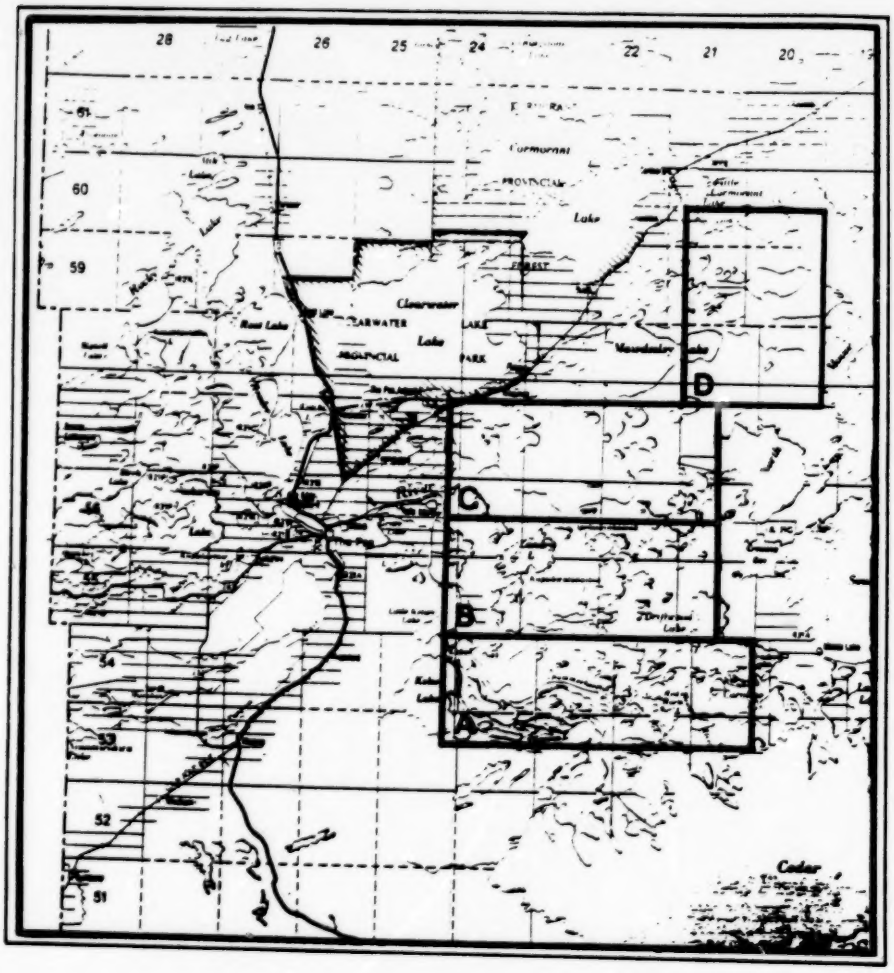

Figure 2. Boundaries and locations of the 4 strata used in aerial moose surveys in GHA 8.

RESULTS

Approximately 17% of the area of GHA 8 was surveyed. Within the strata, the sampling intensities were 22%, 21%, 17%, and 12%, respectively. The results of the analysis of the 1986 data (Table 2) show that the point estimate of the current moose population is 412, with a 95% confidence interval from 291 to 533. This represents a continuation of the long-term decline in moose in GHA 8 (Fig. 3).

DISCUSSION

The unabated decline of moose in GHA 8 since 1976 fully vindicates the actions taken in late 1985 to close hunting and to attempt to reduce the population of wolves. There is no question that the moose have been decreasing in abundance by approximately 9% per year for the last decade, and cannot support either hunting or a large wolf population. Future wildlife management in this area will have to include continuing protection of existing moose, and capitalizing on whatever opportunities might arise to increase the production of twin calves by breeding females. Protection will have to consist of a continuation of closure to hunting and a restriction of the wolf population to a level appropriate to the size of the moose population. Enhancement of reproductive rates may be generated by habitat improvement such as controlled burns, but the feasiblity of such projects will have to be tested.

Table 2. Results of the analysis of 1986 data.

STRATUM NUMBER	NUMBER OF QUADRATS	SAMPLE QUADRATS	QUADRAT SIZE (SQ KM)	MEAN MOOSE / QUADRAT	VARIANCE
A	220	47	2.91	0.62	0.85
B	198	42	2.91	0.52	1.67
C	242	41	2.91	0.34	0.68
D	252	28	4.86	0.36	0.46
Totals	912	158			

Mean number of moose/sq km: 0.131

Estimated total population: 412

95% confidence interval: +/- 121 (29%)

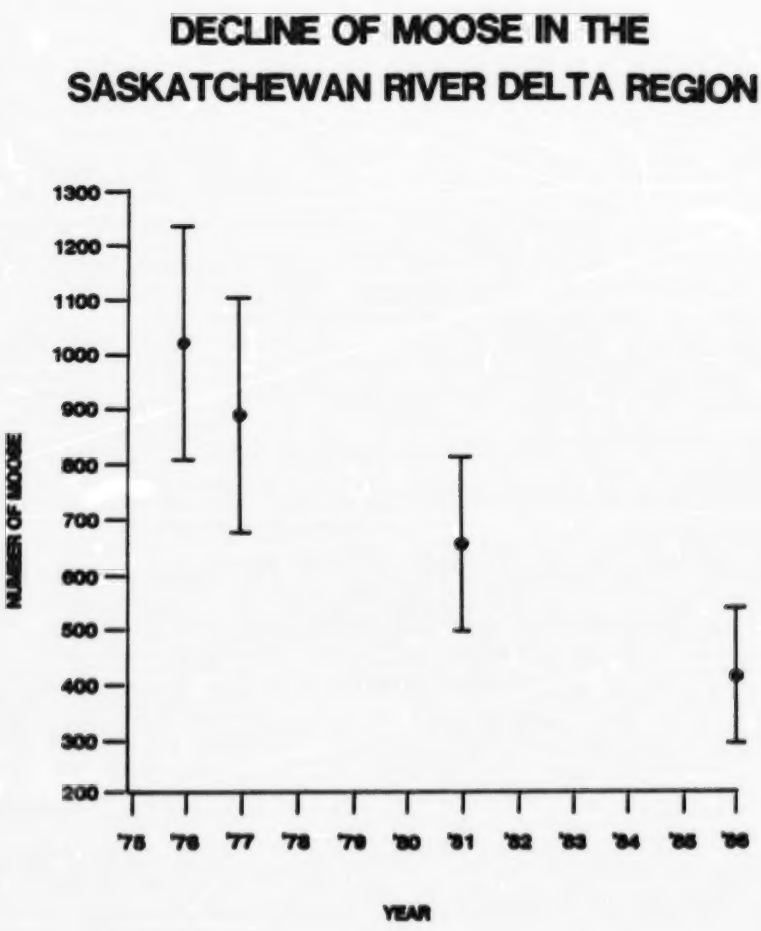

Figure 3. Moose population estimates for GHA 8: 1976 to 1986. Point estimates are shown as solid circles. Confidence intervals (95%) are shown as vertical bars.

If managers are to evaluate the success of their actions, monitoring of moose and wolf populations should continue. Regular estimates of i) the size of the moose population (perhaps every 3 years), ii) production and survival of moose calves, and iii) annual estimates of the status of wolf populations are required.

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